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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,081	12/07/2001	Young Mo Gu	0465-0880P-SP	8567
2292	7590	07/20/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			TORRES, JUAN A	
			ART UNIT	PAPER NUMBER
			2631	

DATE MAILED: 07/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/005,081

Applicant(s)

GU ET AL.

Examiner

Juan A. Torres

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment - After Non-Final 06/29/2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The modifications to the drawings were received on 06/29/2005. These modifications are accepted by the Examiner.

Specification

The disclosure is objected to because of the following informalities: in page 15 paragraph [0064] the recitation "FIG. 5A" is improper. It is suggested to be changed to "FIG. 6" (see previous Office Action).

Appropriate correction is required.

Claim Objections

In view of the amendment filed on 06/29/2005, the Examiner withdraws claim objections of the previous Office Action.

Response to Arguments

Applicant's arguments filed on 06/29/2005 have been fully considered but they are not persuasive.

Regarding claims 1 and 4:

The Applicant contends, "The Examiner states that Strolle et al. shows a VSB receiver having an intermediate frequency signal generator, a demodulator generating a complex base band signal having an I channel and a Q channel and a base band

matched filter filtering at least one of the I channel signal and the Q channel signal. The Examiner admits that Strolle et al. does not specifically disclose that the matched filter is complex. The Examiner relies on Franks to disclose a complex base band matched filter. The Examiner feels it would have been obvious to one of ordinary skill in the art to supplement the matched filter disclosed by Strolle et al with the low-pass equivalent operation on complex envelope signals disclosed by Franks.

In regard to claim 2, which has now been incorporated into claim 1, the Examiner feels that Franks also discloses that the complex base band matched filter includes the recited filters and adders and their respective connections.

By way of the present amendment, Applicants have added the limitations of claim 2 into claim 1. Claim 4 has also been rewritten into independent form to include the limitations of original 1. Applicants submit that amended claims 1 and 4 are not obvious over this combination of references.

The Strolle et al. reference includes the use of a matched filter, although these matched filters are not necessarily the same as that of Franks. Franks discloses the operation of a complex filters, but Strolle et al. does not disclose the same structure and operation as Franks. Since the present invention uses a complex base band matched filter, this is clearly not shown in Strolle et al. The purpose of Strolle et al. is to provide a digital television receiver including a source of a digital television receiver not focused on a matched filter. While Franks discloses the operation of a complex filter, it only discloses the theory concerning processing a signal by a complex number generally.

Applicants submit that it would not be obvious to one of ordinary skill in the art to utilize the complex number arrangement of Franks with Strolle et al. or the other references.

The present invention includes a vestigial sideband receiver including a complex base band match filter. This arrangement is not shown in either of the references or their combination. Applicants submit that claims 1 and 4 are patentable over this combination of references.”.

The Examiner disagrees and asserts, that, as indicated in the previous Office Action, the suggestion/motivation for combining the cited references would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 1119). The fact that the new claim 1 incorporates the limitations of the previous claim 2 doesn't render any patentability because claims 1 and 2 were rejected using the same references and motivation/suggestion. For these reasons and the reasons indicated in the previous Office Action the rejections of claims 1 and 4 are maintained.

Regarding claim 3:

The Applicant contends, “The Examiner rejected claim 3 as being obvious over Strolle et al. and Franks and further in view of Endres et al. (U.S. Patent 6,426,972). This rejection is respectfully traversed. The Examiner admits that Strolle and Franks do not disclose the complex base band match filter desired so that the frequency characteristic is identical to a frequency spectrum of the base band signal.

The Examiner feels that it would have been obvious to supplement the matched filter of Strolle et al. and Franks with the frequency characteristics detail disclosed by Endres et al. It is submitted that even if the Endres et al. reference does show the

features suggested by the Examiner, that this claim remains allowable based on its dependence from allowable claim 1.”.

The Examiner disagrees and asserts, that, as indicated in the previous Office Action, because the rejection of claim 1 is maintained, the rejection of claim 3 is also maintained.

Regarding claim 5:

The Applicant contends, “The Examiner states Claydon et al. shows a receiver having a first multiplier multiplying a received signal by intermediate frequency signals to generate an intermediate band signal, a second multiplier to demodulate intermediate frequency band signal to an I channel signal and the third multiplier to demodulate the intermediate frequency band signals to a Q channel signal. The Examiner admits that Claydon et al. does not disclose a complex base band matched filter filtering at least one of the channel signals to output a complex signal. The Examiner relies on Franks to disclose a complex base band match filter filtering at least one of the two demodulated channel signals. Applicants submit that the Claydon et al. reference has a purpose of providing a CMOS integrated signal processing system for a specific sampling receiver, but not a complex base band matched filter. Thus, the purpose and effect of this reference is completely different from that of the present invention. The Claydon et al. reference does not show the operation of a complex filter in the same manner that Strolle et al. does not show such a complex filter. While Franks shows the theory of processing a signal by a complex number in general, Applicants submit that the operation of the present invention would not be obvious over a combination of Claydon

et al. and Franks. Thus, the present invention includes a vestigial sideband receiver applying a complex base band match filter which is not shown by either the references and which would not be obvious thereover. Accordingly, Applicants submit that claim 5 is likewise allowable.”.

The Examiner disagrees and asserts, that, as indicated in the previous Office Action, Claydon discloses, literally “In an aspect of the invention the input signal is modulated, and the apparatus further comprises an I,Q demodulator. First and second analog-to-digital converters are respectively coupled to an in phase output and a quadrature output of the demodulator, wherein the sinc interpolator accepts in phase and quadrature signals”, and further “The apparatus includes a matched filter which has an input coupled to the sinc interpolator and an output coupled to the loop filter. Preferably the matched filter is a square-root raised cosine filter”, and further “In still another aspect of the invention the input signal is modulated, and the apparatus further comprises an I,Q demodulator, and a sampler comprising first and second analog-to-digital converters respectively coupled to an in phase output and a quadrature output of the demodulator, wherein the sinc interpolator accepts in phase and quadrature outputs of the sampler ” (see section “SUMMARY OF THE INVENTION” of Claydon’s patent column 2 line 24 to column 5 line 10). So the purpose and effect of Claydon reference is not completely different all, if fact it is the same field of endeavor, as indicated in the previous Office Action. Again, the suggestion/motivation for combining the sited references would have been to reduce cross coupling of the I and Q components in the

filtering operation (Franks page 1119). For these reasons and the reasons indicated in the previous Office Action the rejections of claim 5 is maintained.

Regarding claims 6 and 8-10:

The Applicant contends, "Applicants submit that claim 6 is allowable based on its dependency from allowable claim 5. Even if the Endres references reference does teach the features suggested by the Examiner, Applicants submit that the claims remains allowable based on its dependency from an allowable independent claim."

The Examiner disagrees and asserts, that, as indicated in the previous Office Action, because the rejection of claim 5 is maintained, the rejections of claims 6 and 8-10 are also maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle (US 5872815) in view of Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8).

As per claim 1 Strolle discloses a VSB receiver comprising: an intermediate frequency signal generator generating an intermediate frequency band signal from a received signal (figure 1 block 102 column 6 line 15 and column 6 lines 27-30); a demodulator generating a complex base band signal consisting of an I channel signal and a Q channel signal using the intermediate frequency band signal and at least one local carrier wave signal (figure 1 block 52 column 6 line 15); and a base band matched filter filtering at least one of the I channel signal and the Q channel signal (figure 1 block 110 column 6 line 46). Strolle doesn't disclose specifically that the matched filter is complex even though he acknowledge that prior art use complex matched filters (column 9 lines 11-14). Franks discloses a complex base band matched filter that includes a first base band matched filter filtering a real domain of the I channel signal, a second base band matched filter filtering an imaginary domain of the I channel signal, a third base band matched filter filtering a real domain of the Q channel signal, a fourth base band matched filter filtering an imaginary domain of the Q channel signal, a first adder adding the filtered real domain signals of the I channel and the Q channel output from the first base band matched filter and the third base band matched filter to output the resultant value as a new I channel signal, and a second adder adding the filtered imaginary domain signals of the I channel and the Q channel output from the second

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base band matched filter and the fourth base band matched filter to output the resultant value as a new Q channel signal (page 1119 figure 10 appendix). Strolle and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle with the low-pass equivalent operation on complex envelope signals disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 1119). Therefore, it would have been obvious to combine Strolle with Franks to obtain the invention as specified in claim 1.

As per claim 4 Strolle discloses a VSB receiver comprising: an intermediate frequency signal generator generating an intermediate frequency band signal from a received signal (figure 1 block 102 column 6 line 15 and column 6 lines 27-30); a demodulator generating a complex base band signal consisting of an I channel signal and a Q channel signal using the intermediate frequency band signal and at least one local carrier wave signal (figure 1 block 52 column 6 line 15); and a base band matched filter filtering at least one of the I channel signal and the Q channel signal (figure 1 block 110 column 6 line 46). Strolle doesn't disclose specifically that the matched filter is complex even though he acknowledge that prior art use complex matched filters (column 9 lines 11-14). Franks discloses a complex base band matched filter that includes a base band matched filter filtering the I channel signal, a base band matched filter filtering the Q channel signal, and an adder adding the filtered I channel signal used as the real domain and the filtered Q channel signal used as the imaginary domain to

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output the added complex signal as a I channel signal (page 1119 figure 10 appendix). Strolle and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle with the low-pass equivalent operation on complex envelope signals disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Strolle with Franks to obtain the invention as specified in claim 4.

Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle (US 5872815) and Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8) as applied to claim 1 above, and further in view of Endres (US 6426972). Strolle and Franks discloses claim 1. Strolle and Franks don't specifically disclose that he complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal. Franks discloses that the he complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal (column 3 line 61 to column 5 line 4). Strolle, Franks and Endres are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle and Franks with the frequency characteristics detail

disclosed by Endres. The suggestion/motivation for doing so would have been to reduce the inter-symbol interference in the filtering operation (Endres column 4 line 2-4).

Therefore, it would have been obvious to combine Strolle and Franks with Endres to obtain the invention as specified in claim 3.

Claims 5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claydon (US 5724396) in view of Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8).

As per claim 5 Claydon discloses a receiver comprising: a first multiplier multiplying a receiving signal by an intermediate frequency signal to generate an intermediate frequency band signal (figure 3 block 24 column 6 lines 40-42); a second multiplier multiplying the intermediate frequency band signal by a first local carrier wave signal to demodulate the intermediate frequency band signal to an I channel signal (figure 3 block 1 column 6 lines 44-50); a third multiplier multiplying the intermediate frequency band signal by a second local carrier wave signal to demodulate the intermediate frequency band signal to a Q channel signal (figure 3 block 2 column 6 lines 44-50). Claydon doesn't disclose a complex base band matched filter filtering at least one of the demodulated I channel signal and the demodulated Q channel to output a complex signal which includes a first base band matched filter filtering a real domain of the I channel signal, a second base band matched filter filtering an imaginary domain of the I channel signal, a third base band matched filter filtering a real domain of the Q channel signal, a fourth base band matched filter filtering an imaginary domain of the Q

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channel signal, a first adder adding the filtered real domain signals of the I channel and the Q channel output from the first base band matched filter and the third base band matched filter to output the resultant value as a new I channel signal, and a second adder adding the filtered imaginary domain signals of the I channel and the Q channel output from the second base band matched filter and the fourth base band matched filter to output the resultant value as a new Q channel signal. Franks discloses a complex base band matched filter that includes a first base band matched filter filtering a real domain of the I channel signal, a second base band matched filter filtering an imaginary domain of the I channel signal, a third base band matched filter filtering a real domain of the Q channel signal, a fourth base band matched filter filtering an imaginary domain of the Q channel signal, a first adder adding the filtered real domain signals of the I channel and the Q channel output from the first base band matched filter and the third base band matched filter to output the resultant value as a new I channel signal, and a second adder adding the filtered imaginary domain signals of the I channel and the Q channel output from the second base band matched filter and the fourth base band matched filter to output the resultant value as a new Q channel signal (page 1119 figure 10 appendix). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation

(Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 5.

As per claim 8 Claydon and Franks discloses claim 5. Franks also discloses that the complex base band matched filter includes a base band matched filter filtering the I channel signal, a base band matched filter filtering the Q channel signal, and an adder adding the filtered I channel signal used as the real domain and the filtered Q channel signal used as the imaginary domain to output the added complex signal as a I channel signal (page 1119 figure 10 appendix). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 8.

As per claim 9 Claydon and Franks discloses claim 5. Claydon also discloses the intermediate frequency signal is $2\cos(wc-wi)t$; $wc=2\pi fc$ where fc is the frequency of the carrier signal and $wi=2\pi fi$ where fi is the frequency of the intermediate frequency signal (figure 3 block 33 column 6 lines 44-46). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I

and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 9.

As per claim 10 Claydon and Franks discloses claim 5. Claydon also discloses that the first local carrier wave is $2\cos\omega t$, and the second local carrier wave is $2\sin\omega t$; $\omega = 2\pi f_i$ where f_i is the frequency of the intermediate frequency signal. (figure 3 blocks 1 and 2 column 6 lines 46-53). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 10.

Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Claydon (US 5724396) and Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8) as applied to claim 5 above, and further in view of Endres (US 6426972). Claydon and Franks discloses claim 5. Claydon and Franks don't specifically disclose that the complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal. Franks discloses that the complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band

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signal (column 3 line 61 to column 5 line 4). Claydon, Franks and Endres are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Claydon and Franks with the frequency characteristics detail disclosed by Endres. The suggestion/motivation for doing so would have been to reduce the inter-symbol interference in the filtering operation (Endres column 4 line 2-4). Therefore, it would have been obvious to combine Claydon and Franks with Endres to obtain the invention as specified in claim 6.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
07-12-2005


KEVIN BURD
PRIMARY EXAMINER